

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (currently amended): An isolated nucleic acid sequence ~~or fragment thereof~~ comprising or complementary to a nucleic acid sequence encoding a polypeptide having polyketide synthase activity, wherein the amino acid sequence of said polypeptide has at least 65% 95% amino acid sequence identity to an amino acid sequence comprising SEQ ID NO:10.

Claim 2 (currently amended): An isolated nucleic acid sequence ~~or fragment thereof~~ comprising or complementary to a nucleic acid sequence having at least ~~70%~~ 90% nucleotide sequence identity to a nucleic acid sequence comprising SEQ ID NO:8, wherein said isolated nucleic acid sequence encodes a polypeptide having polyketide synthase activity.

Claim 3 (withdrawn): An isolated nucleic acid sequence or fragment thereof comprising or complementary to a nucleic acid sequence encoding a polypeptide, wherein the amino acid sequence of said polypeptide has at least 65% amino acid sequence identity to an amino acid sequence comprising SEQ ID NO:11.

Claim 4 (withdrawn): An isolated nucleic sequence or fragment thereof comprising or complementary to a nucleic acid sequence having at least 70% nucleotide sequence identity to a nucleic acid sequence comprising SEQ ID NO:9.

Claim 5 (cancelled)

Claim 6 (currently amended): The isolated nucleic acid sequence of claim ~~5~~ 1, wherein said polyketide synthase ~~enzyme~~ modulates the production of at least one polyunsaturated fatty acid when expressed in a host cell.

Claim 7 (original): The isolated nucleic acid sequence of claim 6, wherein said at least one polyunsaturated fatty acid is selected from the group consisting of eicosapentaenoic acid and docosahexaenoic acid.

Claim 8 (previously presented): The isolated nucleic acid sequence of claim 1 wherein said sequence is isolated from *Thraustochytrium sp.*

Claim 9 (currently amended): The isolated nucleic acid sequence of claim 8 wherein said sequence is isolated from ~~*Thraustocytrium*~~ *Thraustochytrium aureum*.

Claim 10 (withdrawn): A purified protein encoded by said nucleic acid sequence of claim 1 or claim 3.

Claim 11 (withdrawn): A purified protein or fragment thereof comprising an amino acid sequence having at least 65% amino acid sequence identity to an amino acid sequence comprising SEQ ID NO:10 or SEQ ID NO:11.

Claim 12 (currently amended): A method of producing a polyketide synthase enzyme comprising the steps of:

- a) isolating a nucleic acid sequence comprising SEQ ID NO:8;
- b) constructing a vector comprising said isolated nucleic acid sequence operably linked to a regulatory sequence; and
- c) introducing said vector into a host cell under time and conditions sufficient for expression of said polyketide synthase enzyme, whereby said polyketide synthase enzyme is produced.

Claim 13 (currently amended): The method of claim 12 wherein said host cell is selected from the group consisting of a an eukaryotic cell and a prokaryotic cell.

Claim 14 (previously presented): A vector comprising a nucleic sequence comprising SEQ ID NO:8, operably linked to a regulatory sequence.

Claim 15 (original): A host cell comprising said vector of claim 14.

Claim 16 (currently amended): The host cell of claim 15 wherein said host cell is selected from the group consisting of a an eukaryotic cell and a prokaryotic cell.

Claim 17 (withdrawn): A plant cell, plant or plant tissue comprising said vector of claim 14, wherein expression of said nucleic acid sequence of said vector results in production of at least one polyunsaturated fatty acid by said plant cell, plant or plant tissue.

Claim 18 (withdrawn): The plant cell, plant or plant tissue of claim 17, wherein said at least one polyunsaturated fatty acid is selected from the group consisting of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

Claim 19 (withdrawn): One or more plant oils or acids expressed by said plant cell, plant or plant tissue of claim 17.

Claim 20 (withdrawn): A transgenic plant comprising said vector of claim 14, wherein expression of said nucleic acid sequence of said vector results in production of at least one polyunsaturated fatty acid in seeds of said transgenic plant.

Claim 21 (withdrawn): A method for producing a polyunsaturated fatty acid comprising the steps of:

- a) isolating a nucleic acid sequence comprising SEQ ID NO:8 or SEQ ID NO:9;
- b) constructing a vector comprising said isolated nucleic acid sequence operably linked to a regulatory sequence;

- c) introducing said vector into a host cell for a time and under conditions sufficient for expression of polyketide synthase enzymes encoded by said isolated nucleic sequence;
- d) exposing said polyketide synthase enzymes to a substrate to produce a product; and
- e) exposing said product to at least one enzyme selected from the group consisting of a ketosynthase, a ketoreductase, a dehydratase, an isomerase, an enoyl reductase, a desaturase, and an elongase in order to produce said polyunsaturated fatty acid.

Claim 22 (withdrawn): The method of claim 21, wherein said substrate is selected from the group consisting of acetyl-CoA malonyl-CoA, malonyl-ACP, methylmalonyl-CoA and methylmalonyl-ACP.

Claim 23 (withdrawn): The method of claim 21, wherein said polyunsaturated fatty acid is selected from the group consisting of EPA and DHA.

Claim 24 (withdrawn): A composition comprising at least one polyunsaturated fatty acid produced according to the method of claim 21.

Claim 25 (withdrawn): The composition of claim 24 wherein said at least one polyunsaturated fatty acid is selected from the group consisting of EPA and DHA.